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ABSTRACT

This manual, based on work completed for Francophone distance educators in Ontario, explores the factors and dynamics needed for learning and teaching in new classrooms that are created by the conferencing technologies of audio, audiographic, computer, and compressed video. These classrooms are new in that learners are not gathered physically in one location, and the cues available for predicting and assessing others' reactions are different from those available in face-to-face interactions. These four technologies are the most cost effective and accessible alternatives that provide the same technical opportunities in each site and allow emulation of the traditional classroom. Part 1 of this guide focuses on the key issues involved in establishing the learning context. Principles of adult learning, learning strategies, and models of instruction are discussed. Part 2 reviews each of the conferencing technologies concerning the following topics: (1) description; (2) critical preparation; (3) indicators of good use; (4) indicators of poor use; (5) examples from current practice; and (6) selected readings (85 in all). Eight appendixes provide taxonomies of learning strategies, additional guidelines, and some evaluation principles and forms. (Contains 50 references.) (SLD)

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A Practical Guide to the Use of Conferences

Elizabeth J. Burge Judith M. Roberts

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Classrooms with a *Difference*

A Practical Guide to the Use of Conferencing Technologies

Elizabeth J. Burge Judith M. Roberts

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Field Services and Research
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(Affiliated with the University of Toronto)

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Lynn Romero of OISE's Distance Learning Office deciphered all our scratchings and handled all the changes with equanimity.

Any errors remaining are ours.

Introduction

This manual explores the factors and dynamics needed for learning and teaching in new classrooms that are created by four conferencing technologies: audio, audiographic, computer and compressed video.

The classrooms are new in two ways: the learners are not gathered physically in one location, and the cues available for predicting and assessing others' reactions are different from those available in face-to-face interactions. But we believe that the underlying dynamics of learning are not new: learners still have to acquire information and process it into meaningful mental frameworks and applications. Learners are also still involved with the interpersonal dynamics of learning and with spending their time productively with their peers, teacher, librarians, etc. The challenge for educators therefore is to accommodate the conferencing technologies to the new, and not so new, characteristics of conference-mode classrooms.

The four interactive communications technologies examined in this guide enable us to construct networks of classrooms that are symmetrical in two ways.

- Each node or site has exactly the same technical opportunities for the creation and/or reception of intensive interactions in real or delayed time.

- The whole network is emulative in many ways of traditional face-to-face classrooms, since everyone can talk across the class space to each other and expect a response.

The four technologies are treated as a discrete group because they are the most cost effective and accessible ones providing such symmetry and emulation. They differ, therefore, from other media used in training and education, such as one-way video with two-way audioconferencing, or audio cassettes, or multi-media.

We assume, however, that any of the interactive technologies can and will be used in conjunction with print and/or audio-visual course materials. Such formats "deliver" most of the content of a course. The interactive technologies promote "live" person-to-person "dialogue", i.e., informed discussion, not just about that content, but about the relevant personal knowledge and experience of others in the class.

Each conferencing technology, if appropriately used, could promote interaction between learners and their teacher, between a learner and library staff, or between learners and guest experts in the course. Furthermore, the skilful use of the technologies will promote productive interaction amongst the learners themselves, without always the controlling presence of the teacher. Such dialogue is a key dynamic in learning if you value the development of inter-dependent and self-responsible learners.

We have used the term adult throughout the manual, although much of the information is also relevant to contexts having younger learners. Therefore staff and teachers in schools are included in our potential audience of adult educators, faculty and staff in post-secondary education or training, and planners and administrators responsible for innovative program development.

Why should you read this manual?

- You want to explore the inescapable human elements associated with relationships and responsibilities in learning.
- You want to explore how and why teaching and learning can accommodate the four conferencing technologies.
- You are interested in going beyond the lecture/presentation format in teaching.
- You are interested in designing resource-based learning materials for use in both face-to-face and distance modes.
- You want some practical guidelines for the interactive use of telephones, computers and compressed video.

We think that this manual breaks some new ground in its placement of adult learning issues before technology issues and in its offering of key suggestions for effective use of the four conferencing technologies. The practical suggestions and readings are not exhaustive, but they will help you make a sound beginning.

Our focus in this manual does not permit us to cover management, evaluation or learner support aspects associated with the use of conferencing technologies in education. Material on those topics will be found in other literature on distance education, higher education and telecommunications.

OUR GENERAL BELIEFS

A word is necessary here about our general beliefs, because no education is value-neutral. This manual shows an unashamed bias towards a mutually respectful, collaborative relationship between learner and teacher (as distinct from one based on consistently controlling behaviour and attitudes from the teacher). We also have specific beliefs about technology which are listed in Part 2.

Declaring our values and beliefs allows us to be prescriptive to a certain degree. We do not have to be unnaturally passive or hesitant in offering the lessons we have learned from our experience. In our declarations, you are given the consumer's equivalent of the "caveat emptor" - let the buyer beware. You are helped to exercise more informed choices about what you read in this manual. You are free to accept, reject or modify our guidelines.

- We believe in being congruent between what we preach and what we practice, even when this stance is difficult to maintain. This manual therefore focusses on learning and teaching before it focusses on the conferencing technologies.

- We believe that learning is an integrated, holistic process involving all the dimensions of being human. So this manual identifies strategies for learning and teaching that focus not just on the intellectual elements of learning but also on the physiological and emotional elements.

- We believe in using reflective practice to inform theory and challenge conventional wisdom. So this manual goes beyond the traditional boundaries of "how-to-do-distance education" to include knowledge from related fields such as adult and feminist education and collaborative learning.

- We believe that technology is only as good as the humans who design its operation. So this manual identifies people-centred strategies to inform decision making and to keep the technology transparent, i.e., reliable and subservient to the principles of appropriate learning and teaching.

SUMMARY

Part 1 focusses on the key issues involved in establishing the learning context

- adult learning principles
- learning strategies
- collaborative learning
- models of teaching
- stages of development
- course design

Part 2 reviews the four conferencing technologies under these headings

- description
- critical preparation
- indicators of good use
- indicators of poor use
- examples from current practice
- selected readings

PART 1

Establishing the Learning Context

- Adult Learning Principles
- Learning Strategies
- Collaborative Learning
- Models of Teaching
- Stages of Development
- Course Design
- References
- Selected Readings

Adult Learning Principles

Principles of adult learning are important because they guide how we think about adults as learners and how we understand our own experience of being learners. Detailed treatments of adults as learners may be found in publications such as Barer-Stein & Draper, in press; Boud & Griffin, 1987; Brookfield, 1987; Brundage & MacKeracher, 1980; Cranton, 1989; Knowles, 1990; Merriam, 1993; Merriam & Caffarella, 1991; Morgan, 1992; Thorpe, Edwards & Hanson, 1992.

We list below the principles that guide our own practice.

- Adults learn best if they are free from undue stress, boredom, overload of information and are not trying to second guess the teacher's objectives.

- Adults are helped to learn when their relevant past experiences are applied in learning activities.

- When learners see themselves as competent, and are confirmed in those perceptions, learning may feel easier.

- Teaching and learning are enhanced when teachers and learners collaborate to set directions, design and implement activities and assess outcomes.

- Since adults usually have learning needs closely related to their lives and their work, they tend to define a useful learning experience as one in which they can talk about the new knowledge and/or directly apply it to complete tasks and solve problems. Adults deserve to know the educator's rationale for the content in the course. To know the "why" of learning is as important as knowing the "how" of learning.

- Adults are helped to learn when they are able to see new ideas and try them out: "Minds have to be like parachutes; they only work when they open." Some of this change process is called Unfreezing, Changing and Re-freezing (Stewart, 1991, p. 172).

- In any adult class, no two people will learn in exactly the same way. Each person has a set of preferred ways of processing incoming information, handling the stresses of learning, and identifying new

learnings (Huff, Snider & Stephenson, 1986; Kolb, 1984; Messick, 1976).

Here are some examples of differences in learning style.

- Some people are visual learners: they have to see the information before they can best process and store it. Others are auditory: they need to hear it spoken.

- Some want to get the "big picture" first (holists) and then focus on details. Others want to build up to the whole picture by working at the details first (serialists). The metaphor of a "bird's eye view" versus a "worm's eye view" illustrates this difference.

- Some people prefer to try something out before they reflect on what happened, draw some conclusions and then experiment with the new knowledge gained; others prefer to watch an expert before they try. Others again want to read about the underlying principles then formulate a plan of action before experimenting.

- Some like a very structured course, others prefer less structure.

- Some are divergent thinkers; they are always thinking up new ideas. Others are convergent; they look for closure faster than do the divergent thinkers.

- Some will be very attentive to many details of their immediate context; they are field-dependent. Others will focus only on selected details; they are field-independent (Witkin, Moore, Goodenough & Cox, 1977).

- Some differences in ways of learning originate and continue in gender-based socializations, according to the substantial body of research that now exists.

  Many women experience classroom interactions differently than do men in the same classroom (Biklen & Pollard, 1993; Luke & Gore, 1992; MacKeracher, in press; Tannen, 1990).

  Women can suffer problems around access to education and its technology (Wells, 1991).

  Many women operate with sets of moral values that contrast

with those of many men (Gilligan, 1982).

Women have particular and complex needs that arise from balancing their studies with their work, home and personal management (Kirkup & von Prümmer, 1990).

We believe that gender issues in learning cannot be ignored, especially in settings that are mediated by a conferencing technology. If, as Kiesler (1992) suggests, one of the possible impacts of technology is to amplify existing practice, e.g., make it more efficient, then we think that technology usage could also intensify the negative elements of gender-based interaction in classrooms.

- Mistakes are important in learning. They generate valuable feedback and may show that risks are being taken.

> ...mistakes happen only when we're committed to making things work ... fear of mistakes can paralyze us. When we get past the fear of making mistakes, we can take risks and reach for mastery. (Ellis, 1991, pp. 302-3)

- Time is an important element of adult learning: time to take in new information, to organize it, to look for links to existing mental frameworks or to make new connections; time to rest; time to be silent; time to reflect; time to play with ideas; time to critique ideas; time to listen to others; time to express insights. Time is important and therefore not to be wasted or devalued.

- When adults acquire new skills, they should have expert and fast feedback to practice those skills.

THEMES

Five themes emerge from these principles, and we offer them as a way to focus your thinking

- **relationships**
  between people, between new ideas, and between existing knowledge frameworks and new information

- **responsibilities**
  for the efficient and effective use of energies and resources by learners and teachers

- **organization**
  of the course learning resources, of the learner's time and energy, and of productive activity

- **individuality**
  in terms of a learner's learning skills, styles and needs, and life conditions and resources

- **expression**
  of learnings, of insights, of problems, of feelings. The familiar expression "How do I know what I think until I see (or hear) what I say" has much wisdom in terms of how learners may express new learnings.

Each time you think about a conferencing technology, check its intended use against each theme – how would each theme be evidenced?

Learning Strategies

There is an acknowledged repertoire of cognitive, affective and performance behaviours, or strategies, that promote learning (Schmeck, 1988). Certain conditions – in and beyond classrooms – will help or hinder the use of those strategies. Therefore each conferencing technology and the teachers' actions may be assessed in terms of how they promote appropriate conditions for the use of learning strategies.

What are these strategies?

Cognitive psychologists have defined learning strategies in various ways (Derry, 1988/89). Their definitions share a focus on the cognitive and self-management processes needed for successful learning. One of the experts in this field is Weinstein who defines learning strategies in terms of processes internal to the learner:

> any behaviours or thoughts that facilitate encoding in such a way that knowledge integration and retrieval are enhanced. More specifically, these thoughts and behaviours constitute organized plans of action designed to achieve a goal ... Examples ... include actively rehearsing, summarizing, paraphrasing, imaging, elaborating, and outlining. (Weinstein, 1988, p. 291)

Another strategy, we believe, is productive discussion with peers. Many adults like to share their own experience and broaden their knowledge by listening to the relevant experience of others. The later section on collaborative learning has more detail about how peer-based strategies may help learning.

CATEGORIES OF STRATEGIES

A recent taxonomy of strategies from cognitive psychology (Tessmer and Jonassen, 1988, see Appendix 1) lists four categories

- **information processing strategies**
  to recall, integrate, organize and elaborate information, e.g., chunk incoming information into manageable "bites", paraphrase, find examples, categorize into logical or meaningful frameworks, generate implications about new information

- **active study strategies**
  to process print-based resources, e.g., highlight text information, scan, make notes

- **meta-learning strategies**
  to monitor how the first two categories of strategy are being carried out, e.g., plan goals, focus attention, assess learning demands

- **preparatory and executive strategies**
  to create the best psychological conditions, e.g., manage time and concentration, relax, and reduce anxiety

When educators focus only on creating the conditions needed for the first set of strategies to operate, they are not attending to the fundamental relationship of mind, heart and body in learning. They may, therefore, create an impoverished set of conditions for learners.

The adult education literature recently added its own comprehensive taxonomies of strategies (Collett, 1990; Gibbons, 1990). In Collett's list of learning skills in adult basic education, for example, a number of skills focus on understanding and managing oneself as a learner and on all the relevant factors and dynamics in the learner's context (see Appendix 2). Other skills focus on techniques for problem-solving and practical thinking. How therefore can the new classrooms created by the conferencing technologies show attention to self and context management? Some of the answers will be found in the following guidelines for collaborative learning, others in the discussions of each technology.

Collaborative Learning

Some educators, in our experience, are wary about using collaborative learning methods. They appear to fear that such methods create classrooms in which the "blind lead the blind" or where no rigorous academic work is completed. They wonder whether the learners may think the teacher is "opting out" or that the teacher's role is diminished. The effect of people talking with each other may highlight differences in learning abilities or even expose polarities in opinion that learners find difficult to deal with. These perceptions are natural and should be acknowledged in a discussion at the beginning of the course about the process and outcomes of collaborative learning.

People need to understand, at the very least, that this mode requires preparation and management; it does not come naturally to many teachers or students, especially if they are accustomed to lecture styles of teaching. However, when learners are skillfully helped to learn with and from each other, the learning outcomes can pleasantly surprise all concerned! This section therefore focusses upon the functions of and conditions for productive and sociable learning discussions. We note here the basic points; for more detail consult Bossert, 1988; Davidson & Worsham, 1992; Johnson & Johnson, 1991; Schmuck & Schmuck, 1992; Slavin, 1983; Tiberius, 1990.

DISCUSSION TYPES

Discussions generally fall into one of three types, each having its own goals (McBeath, 1992, p. 71)

- **instructor-directed discussion**
  motivate participation
  provide for interaction
  recognize contributions
  define terms
  clarify content
  identify assumptions

- **group-centred discussion**
  build on experience
  strengthen relationships
  raise questions
  explore hypotheses

formulate ideas
examine assumptions

- **collaborative discussion**
  involve in problem solving
  share responsibilities
  compare alternatives
  test hypotheses
  base action on criteria
  modify assumptions

One Ontario expert in collaborative learning strongly believes that these goals must be discussed specifically in class so that everyone is clear about their responsibilities: "adults...will probably respond better in a collaborative mode if they are not second guessing their role" (Biro, 1993).

You could regard each one of the above goals from McBeath as a criterion for assessing any discussion. Invite learners to use them in a similar way.

RATIONALE

> Cooperative learning also provides an environment for mastering two of the most essential skills in learning to be an effective thinker: posing good questions and formulating significant problems. (Davidson & Worsham, 1992, p. 3)

Two leading experts list six ways in which collaborative discussion helps learning and the personal monitoring of that learning.

- Learners acquire different skills by working in groups.
- Group discussion allows learners to summarize, explain, elaborate information, which helps encode into long term memory, seek feedback and strengthen what is known.
- Learners develop creative and divergent thinking styles as they adjust to different styles of thinking and expression.
- Learners temporarily suspend the expression of their own opinions while listening to other points of view.

- Peers monitor and regulate each other's thinking as it is held up for critical review and exploration. Peer expectations can increase motivation to come to class prepared.

- Peers can give and get process feedback (on-going), as well as formal feedback at the end of the course (summarized from Johnson & Johnson, 1992, pp. 123-125).

Since learners may need some help in developing the interactive and cognitive skills for collaborative learning, we refer you to the readings in the References and the Selected Readings lists.

GENERIC GUIDELINES

If collaborative learning is to work successfully as a process, task and social elements each need careful attention. The following guidelines relate to teacher functions and behaviour in whole class discussions and in structured small group activities. Appendix 3 provides more detailed ideas for teachers and learners.

• In the very first class, invite learners to share responsibility for productive discussions and everyone's learning. You, the teacher, don't have to carry the "albatross" of total responsibility for everything that happens in the class. Learners have to understand that collaborative learning demands self-discipline and respectful attention to peers; it is not a licence for self-indulgence (Biro, 1993). Negotiate the ground rules for acceptable behaviour early on in such a way that learners "own" those rules: don't present them as a *fait accompli*.

• Expect and encourage each and every learner to participate. Restrict voluble people from dominating the discussion, but avoid giving implicit permission for continual silence from those who always "just listen because I'm thinking". Such silence can disrupt trust and equality of contribution.

• Use short, clear questions when trying to clarify or arrange a task. Avoid questions that begin with "why..." (too threatening), or that are too vague, or too leading. Learners will very quickly figure out your style and respond accordingly.

• Ensure that the small group discussion tasks are clearly understood and are manageable in the time allotted. Also, be sure to allow

enough time for general discussion of the results of the small group work. If learners realize that their work is not given adequate time for consideration, they will adjust their commitment and energies accordingly.

- Avoid hovering over or eavesdropping on learners. If you trust them and if the task is clear, let them get on with it. Let them know that it is their responsibility to return with an intelligent report to their peers and to you, and that it is your responsibility to provide enough time for the discussion and to respond with constructive comment.

- Be a referee rather than a traffic controller; all doesn't have to go through you first. Make it clear, for example, that each small group reporting back to the whole class can expect a critical response from another small group and some general talk before the teacher cuts in. Our experience indicates that most learners will take responsibility for their own learning and will want to talk out ideas amongst themselves. They cannot do so if a teacher's blindness to the dynamics (or habitual ways of control) creates an inhibiting situation.

- In short, act as the guide on the side, not the sage on the stage. Learners' knowledge and experience is valuable. Let them use it to build new frameworks and to add knowledge onto existing ones.

- Avoid embarrassing people by calling on them when they're obviously not prepared. Do unto others as you would have them do unto you.

- Refrain from rescues. If you can't stand the silences while people think, remember that you're not an entertainer who has to fill up every second of time. Good thinking does not happen when learners' attention is diverted to filler words from the teacher.

- Be prepared to discuss a change in agenda if it will help people's interest and energy levels. Flexibility is a strength, not a sign of weakness.

- Provide a summary, or allocate one or more learners to do that for each class. It's important to bring closure to discussions and to check understandings before plunging into the next topic.

USING CONTROVERSY FOR LEARNING

One important aspect of effective collaborative learning is that controversy may develop quite quickly. By controversy, we do not mean arguments about who takes responsibility for various tasks. We refer to sturdy conflict and authentic differences over the intellectual content, clarity of ideas, relevance of theories, definitions of problems or appropriateness of solutions.

The conferencing technologies must be used in such a way that controversy is used for higher order thinking skills, not "damped down" or ignored because learners were not expecting natural, lively debate. Appendix 4 contains some specific guidelines for maximizing the aspect of controversy (summarized from Johnson & Johnson in Davidson & Wortham, 1992). Many books have been written about how to plan for collaborative learning and maximize controversy in group discussions.

SUMMARY

If you can consistently carry out these six "big C's" without talking for more than 30% of the time over the whole course, you'll be doing well.

- Create the climate and negotiate ground rules.
- Connect learners to peers and other resources.
- Confirm new learnings and insights.
- Correct misunderstandings.
- Change the agenda or activities as necessary.
- Challenge learners to more sophisticated thinking or applications.

Models of Teaching

Teaching models are useful because they provide strategic frameworks to inform practical decisions (Joyce, Showers & Rolheiser-Bennett, 1987; Kenway & Modra, 1992; Maher, 1987; Miller, 1988). Educators have many choices between various models of curriculum and teaching, especially if they have the staff and other resources to use a wide range of models (Joyce & Weil, 1986). For example, a teaching model based on one-way delivery or transmission of knowledge will have educators using the lecture method to send information selected by the knower (teacher) to those who need to know (learners). An example of this model is the "extended classroom" approach in which a teacher lectures in front of on-campus learners and those lectures are "beamed out" via a live video transmission to learners in a remote site. Learners then spend most of their class time in a "receive mode".

On the other hand, a model based on dialogue would focus on the learners taking responsibility for coming into class prepared to talk – not only with the teacher, but also across the teacher to their peers. These learners might also gather into smaller groups for structured group exercises. Such a model would value shared information, respect peers' knowledge and create a climate that encouraged questioning about the ownership and use of knowledge. The educator using this model has to provide the connective conditions that promote easy, relaxed, two-way talk across a number of sites. Broadcast types of technology will not be appropriate in this model. Neither will large numbers of learners in classes, because then the opportunities for intensive discussion are reduced.

Here is a different example of a model in use. A teacher may reasonably expect that learners will enter her/his course feeling dependent on the teacher for everything, but will the teacher assume that this condition is permanent? He/she may use Cross' Models 3 or 4 (see below) as the ultimate goal, and deliberately work toward changing the learners' attitudes and skills (Burge & Haughey, 1993). If so, then a highly-structured set of activities may be used for a while until the teacher sees an opportunity to transfer more choice to the learners and to encourage them to be more self-responsible.

A challenge for educators is to translate these ideas into practical tools. Appendices 7 and 8 give you examples of a checklist for assessing group conditions at a local site and a form for evaluating

an audioconferenced course that relied on the extensive dialogue model.

FOUR MODELS

Cross (1987) has proposed four models of teaching for adult education that are free of academic jargon. Two models (1 & 2) are teacher-centred and two (3 & 4) are learner-centred.

Model 1 *I teach what I know*

The teacher
- covers the course information systematically and in an orderly way
- presents facts and principles
- uses short answer tests for understanding of facts
- sees knowledge as an end product, not as a process
- spends most of the class time lecturing

Model 2 *I teach what I am*

The teacher
- models how the educated mind works
- shows, via lectures, how a competent mind deals with the knowledge of a discipline
- does not try to cover all content
- sees learning as a process, not a product
- evaluates by asking learners to show mental competence

Model 3 *I develop minds*

The teacher
- is concerned about intellectual development
- argues that the key student tasks are analysis, synthesis and evaluation of information
- uses discussions, case studies and questioning for discovery
- evaluates learning by essays or problem solving

Model 4 *I develop people*

The teacher
- is concerned about whole person development, a holistic approach

- has a relatively informal (but not irresponsible) style
- knows learners well, on and off campus
- diagnoses for development of learning skills

Each model requires its own set of teaching skills. Because we value the use of Models 3 and 4, we are concerned with several issues that arise when people communicate in groups for learning. One issue, discussed above, is collaboration and the handling of controversy. Another issue is developmental sequence, the stages that individuals and groups go through as they mature. The next section introduces you to some key ideas and readings.

Stages of Development

There are several clusters of theories about how people mature (Brundage & MacKeracher, 1980). One group focusses on ages and stages of personal growth over a life-span, a second on the maturation of personal learning skills and styles, and a third on the behaviour patterns shown by people when they are involved for an extended time with a certain context. The first cluster is beyond the scope of this guide, but the second and third clusters need at least an introduction because they are relevant to contexts using the conferencing technologies.

Regarding the maturation of personal learning skills and styles, we can exemplify the work of Perry (1981), Belenky, Clinchy, Goldberger & Tarule (1986), and Kolb (1984). You will probably recognize evidence of their ideas in your teaching and educational work.

Perry is best known for his scheme of cognitive and ethical development which proposes a growth from dualistic thinking ("black & white" thinking with authorities holding the only valid knowledge) through relativistic approaches (great diversity in sources of valid knowledge) to a commitment to one's own informed choice of knowledge sources and application (personal decisions are made about knowledge uses and sources, and may be revised as appropriate). In a context using conferencing technologies, teachers can look for learners operating at the early levels of development and plan ways to help them work at more advanced levels.

Belenky and her colleagues carried out landmark research on women's ways of knowing. They identified six ways – including being a very passive receiver of others' knowledge, through identification of personal knowledge, to active constructed knowing that integrates personal, rational and intuitive thinking and the external knowledge of experts. Many educators are finding that the six ways are useful for helping adult women learners understand some of their own growth needs.

Kolb (1984) developed a cycle of experiential learning that involves direct, concrete experience (feeling), reflective observation (seeing), abstract conceptualization (thinking), and active experimentation (doing). He argues that when learners are helped to work through all these ways of getting information and then doing something

with it, they are likely to develop towards higher stages of integrated and interdependent behaviour.

The third cluster of development theories – behaviour patterns shown by people when involved with a certain context over a period of time – can be seen in intrapersonal and interpersonal patterns.

One example of intrapersonal behaviour patterns is the model of four stages in learning (Brundage & MacKeracher, 1980). A learner may enter a new context feeling somewhat defensive, making certain assumptions and relying on standards of personal performance imposed by others. The next, reactive stage shows stronger moves toward personal autonomy and independence via expressions of various feelings and needs – not always positive! In the proactive stage, the learner is feeling more self-confident and willing to work collaboratively with peers. Finally, in the integrative stage, the learner is synthesizing her/his own ideas with those of others, maintaining a balance between independent and interdependent activity, and working well with peers.

One example of interpersonal behaviour patterns is the group development stage model (Tuckman & Jensen, 1977). A group that meets over time will usually experience some or all of four stages of growth

- forming (initial meeting)
- storming (experiencing conflicts, uncertainties)
- norming (setting ground rules to work on the tasks)
- performing (task completion)

Sometimes it does not take long for group members to go through the initial (and often positive) forming phase before they hit the "rocks" of uncertainties, contextual problems, communications difficulties, etc, and begin to "storm" around. If the group gets guidance from an alert teacher to help them work through the conflicts and establish norms and procedures to complete the tasks and work in harmony, then the group is more likely to be effective, and also not reliant upon continuous control by the teacher.

Specific advice on handling other general dynamics associated with adults working together is readily available (Tiberius, 1990).

The classrooms with a difference that are the focus of this Guide will contain many intrapersonal and interpersonal dynamics, as well as the potential for helpful and unhelpful conditions. Teachers who have some information about those dynamics are more likely to be able to diagnose class processes and events in those terms, and less likely to blame the conferencing technology when dynamics go wrong. Naturally, other information helps too, such as adult learning principles, learning strategies, collaborative learning and teaching models (already introduced) and practical procedures for actually designing a course, including the issue of learning objectives. It is time therefore to introduce objectives and design procedures.

Information on learning objectives may be found in many books, such as McBeath (1992), Gronlund (1991) and Cranton (1989). If specific learning outcomes are provided at the beginning of a course, then learners have a clear idea of their goals and teachers can design activities and tests that correspond to the outcomes. Course descriptions that list very general outcomes, such as "you will gain an appreciation for fire safety", do not specify the actual skills or level of knowledge required from the learners. A more specific outcome would read "demonstrate in the fire safety area the correct sequence of the XYZ procedure for containing chemical industrial fires".

Appendix 5 shows a summary of verbs to describe different levels of learning outcomes in the three most often discussed areas of learning – thinking, feeling and doing.

Course Design

The task of designing a course that successfully integrates conferencing technologies and other media such as print is a multi-dimensional one. You have to balance all the factors and dynamics in learning, e.g., learning skills development, learning objectives, provision of resources, stages of cognitive and emotional development, the teaching model, and the need for adult learners to think (and feel) that each activity is worthwhile in itself (no "busy-work") and leads somewhere (it has a cumulative effect). How does one set up a "guidance system" for the whole operation?

A print-based guide – written for learners and teacher alike – can provide such guidance. But the guide has to show clearly how each activity is worthwhile and cumulative. Print materials can guide the activities of the learner working alone and with a tutor; distance educators have developed considerable expertise in the design and delivery of such materials. But now, with the increasing use of conferencing technologies, educators have to guide the activities of learners working with each other and with their tutor or teacher in the new classrooms. How can this be done?

One answer, from our experience with audioconferencing, is to list in the printed learner's manual two types of activities – pre-class and within-class activities. Before the learner arrives in the conferenced class, he/she will have completed all the pre-class preparatory tasks designed for reaching basic understandings of concepts or theories (see first and second levels of the cognitive objectives charts in Appendix 5). Within-class activities can then focus on the teacher helping to confirm (or correct) the learnings from the pre-class work, before guiding an extensive discussion of applications, or challenging the learners to more sophisticated analyses of the relevance of those concepts or theories.

Appendix 6 provides detailed suggestions for the general task of designing print-based guides for courses. The task is organized into six steps, but we acknowledge that the linearity of those steps is usually not observed in practice! The steps below present a practical framework for incorporating all the dynamics and principles of learning.

- **Determine learning needs**
  What do the intended learners say they need?

- **Assess technical support requirements**
  What is the most cost effective technology?
  If there is a choice, what technology will best suit content and format?
  Can several modes be integrated?

- **Design learning objectives, resources, activities, teacher functions**
  What kind of objectives?
  Which information resources?
  Which teacher functions?
  How do we know if learning has occurred?
  How many sessions do we need?
  Is any academic preparation needed?

- **Develop the course manual**
  What organizational information is needed?
  What are the individual session components?

- **Set up support structures**
  Library materials and staff services
  Local sites
  Contingency plans

- **Monitor course progress**
  Informal feedback during the course
  Formal feedback at the end of the course

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We suggest also that you scan issues of the distance education journals such as *Journal of Distance Education/Revue de l'éducation à distance* (from Canada), *The American Journal of Distance Education*, *Open Learning* (from UK), and *Distance Education* (from Australia). Curriculum, adult education, and educational technology journals should also contain relevant articles.

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PART 2

Using the Conferencing Technologies

- Introduction
- Audioconferencing
- Audiographic Conferencing
- Computer Conferencing
- Compressed Videoconferencing
- Conclusion
- Selected Readings

What I like most is the Francophone's ease and familiarity with the telephone. Another factor is that the Franco-Ontarian community is small, and you always know someone or have some experience or something in common. This always helps the class dynamic. (Frenette, 1992) [1]

Another element which was good for me was that there were people here with me in the OISE audioconference classroom – so the class was not completely at a distance. I don't know if this was helpful or not – but I think it was. I got some feedback from these learners, and sometimes it helped interpret the silence of the others. I didn't have any trouble with the "live" learners dominating the conversation. (Frenette, 1992) [2]

I do a lot in small groups – last time I had 6 sites – I give them problems or have them discuss something. I find that this is the best method to get them talking and to bring in their experiences. (Gérin-Lajoie, 1992) [3]

...be well-organized, and plan well. Don't give a lecture, but divide the material into small bites. I pay more attention to pedagogical technique in distance classes. Role-playing is something I use occasionally – variety is the key. (Labrie, 1992) [4]

Introduction

Our objectives in the preceding section were to share with you our beliefs about learning and teaching and to summarize models and strategies of learning which we find pertinent.

Our objective in this section is to indicate how those beliefs, models and strategies can be implemented in a classroom using four interactive technologies: audio, computer, audiographic and compressed video. These four are the most symmetrical, i.e., any site with the equipment can both originate and receive learning materials and activities.

Each technology is briefly described. Then indicators of appropriate and inappropriate use of each technology are suggested. Finally, examples of the use of each technology are given, along with selected readings.

OUR CONFERENCING TECHNOLOGY BELIEFS

In general, conferencing technologies should be tools to help human activities. But like models of teaching, they are not neutral tools. Their use will reflect whatever values the educator holds – consciously or subconsciously – about her/his relationship with learners, and their use will invariably bring advantages and disadvantages. "The technology giveth, but it also taketh away" (Postman, 1992).

Three of our specific beliefs about conferencing technologies for learning or teaching are particularly relevant to this section of the guide.

Limits of Technology

First, technology in and of itself does not promote learning. Learning will most likely happen when sound principles of education are used (Clark, 1992; 1983). The technology has to do more than just collect people together; it has to connect them in productive, animated discussion.

> Indeed, it has been suggested that learning from any media has little to do with the inherent capabilities of the medium per se. Improvements in learning are more likely due to mediating factors, such as

> increased emphasis on lesson design, than to inherent differences among technologies... Moreover, the effectiveness of IT [instructional technology] is more likely contingent upon the informed application of time-tested learning strategies than the technological capabilities of a medium. (Hooper & Hanafin, 1991, pp. 69-70)

Any communications technology will change some of the dynamics of the face-to-face mode. For example, in audioconferencing, we become accustomed to not seeing the reactions of our words on our listeners, and to paying careful attention to what is said and how it is said (Toppings, 1987). The same observation applies to computer conferencing, with the added factors of having to keyboard every word we "speak" (a laborious process for some), of facing the inhibitions which accompany the written word (it is often perceived as having to be correct), and of sometimes dealing with delays in reply (Davie & Wells, 1991).

Two analogies may help you to think about the effects and functions of the technologies. Draper (1988) predicted that the most likely use of computers will be as "gloves for the mind" or to enable learners to reach out and handle a wider range of resources and activities than they could with conventional resources. Another educator uses the analogy of an extension cord to illustrate how interactive technologies can connect people across distances (Thomas, 1992).

Regarding the potential impacts of technologies, Kiesler (1992) suggests that there are two kinds – amplificative and transformative. Amplificative impact shows the same kinds of activities being done, but with increased efficiency (greater ease, speed or volume). Transformative impact shows a qualitative change in how people think, act and react. Next time you read a claim for the benefits of a new technology, check it against Kiesler's two types of result. To what extent might it amplify present practices and classroom conditions (including the negative ones)? What are the real chances of a transformative impact – one that creates unprecedented conditions or processes of interaction? Educators have to assess conferencing technologies in critical as well as creative ways. While they collect people across geographic distances into a group, they do not automatically connect them across psychological distances into a productive group.

Access

Our second belief is that learner access to education programs is critical. Technologies that connect many learners spread over only a few sites (as distinct from many sites) may appear to be impressive in logistical terms, but not as impressive in terms of accessibility. The proverb "The chain is only as strong as its weakest link" applies to the task of building conferencing networks. If potential class members cannot reach a site without incurring the personal costs of time, energy and travel, then how accessible is the education? If women, for example, are denied access because of the structural and political conditions in society, is the new technology really so "helpful" ? Adult learners do not live in a few sites: they are usually scattered over many sites. The first need, therefore, is to install the kinds of technologies that easily link "many groups of one", not just a "few groups of many" (Thomas, 1992).

Focus on Learning

Our third belief is that educators should think learner first – the who, what, why, where and how questions of learning – before they leap into preoccupations with teaching or with technology. The spotlight should first fall on the conditions, dynamics and outcomes of learner activity, in ways that promote learner self-esteem and their competence as pro-active learners. To think "learner first" means, for example, that we think of when and why the learners talk across the teacher to each other, and when and why that teacher intervenes in those dynamics. The teacher in our model of the new classrooms has a changed role, but not a diminished role. She/he becomes an expert guide, as distinct from an omnipotent figure.

Notes

[1] Translated from *Technologies interactives en formation à distance* (1993), L'institut d'études pédagogiques de l'Ontario.
[2] ibid.
[3] ibid.
[4] ibid.

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Audioconferencing

> People feel encouraged to be more polite in terms of not talking others down or interrupting, and more succinct ... less time is wasted.
>
> In a classroom, I could get away with not contributing...in audio conferencing I couldn't back out and not contribute.
> (Two student comments from Burge, Norquay & Roberts, 1987)

DESCRIPTION

An audioconference consists of three technical elements

- some type of telephone, whether the telephone handset at your home or office, or a telephone (speakerphone) which a group of learners can use. Group audioconference terminals have been designed for educational use.

- the telephone network that links these telephones. Generally, standard dial-up telephone lines are used.

- a mechanism by which the various telephones are linked. The telephone companies and other vendors provide such a mechanism in their conference call service[1]. Many distance education programmes have purchased their own equipment and provide such a service to their faculty.

The learning process is facilitated by having an operator trained in the support of distance learning on-line, or on stand-by, throughout audioconference sessions.

Research confirms that audioconferencing is an effective, efficient and acceptable learning tool for a wide variety of cognitive tasks.[2]

Audioconferencing's general strengths are the group interaction and learner support which it provides. Learners are given opportunities to interact and talk to peers, thereby humanizing what could otherwise be impersonal print-based instruction. Such interaction may enhance self-esteem and/or help motivate adult learners who may be studying in situations of personal or social adversity. At the practical level, audioconferencing is accessible anywhere there is a telephone.

CRITICAL PREPARATION

From the general principles outlined in Part 1, we now turn our attention to practical application. The essential point here is to follow learner-centred principles to create classrooms that build on the interactive and real time strengths of the medium. You might want to review the materials in Part 1 to help you expand upon these guidelines for appropriate use of audioconferencing.

- Design a printed guide for use by both learners and the teacher/ moderator. It should

  contain clear directions so that everyone has the correct resources when they need them.

  sequence the learners' activities so that what they do in the audioconference builds on what they previously have studied or read.

  provide a variety of activities, both on and off-line, because differences in learning styles may mean that not everyone will feel entirely comfortable all the time they are on-line.

- Insist on good quality telephone and bridging equipment: straining to hear impedes learning. Test it yourself before you start teaching with it.

- Create an acoustically quiet, but comfortable environment at all sites.

- Familiarize everyone in a course with the equipment and ensure that they are comfortable before challenging them with learning activities. Teachers and learners generally need very little practice before they feel comfortable with it.

INDICATORS OF GOOD USE

Teachers and learners can facilitate learning by ensuring that they adhere to some critical task behaviours.

- Keep contributions focussed.
- Ask questions.
- Use images and metaphors to help others understand.

- Suggest a change in the agenda if things are not working out.
- Paraphrase information.
- Find examples and discuss them.
- Help to link ideas that are being discussed.
- Check on whether your objectives are being reached.
- Get help quickly to remedy poor technical conditions.

Teachers can contribute to learning by observing these critical task guidelines.

- Expect and facilitate learner contributions.
- Set up an agenda.
- Refer to the session objectives.
- Respond to learner contributions as substantively as possible; don't just say "OK".
- Build relationships between ideas.
- Correct misunderstandings quickly.
- Use images and metaphors.
- Restrict lecturing to 10 minute segments; be time aware, not time constrained.
- Encourage learners to talk to each other across you.

In addition to focussing on tasks, both teacher and learners need to display appropriate social behaviour. Learners can assist one another in many ways.

- Introduce yourself whenever you speak until the group recognizes voices.
- Create a social presence that is comfortable for you and your colleagues. A relaxed atmosphere promotes group learning.
- Respond to peer contributions; don't leave everything to the teacher.
- Value the knowledge and experience of the other learners.

Particularly at the start of a course, teachers need to encourage critical social behaviours.

- Ensure that people introduce themselves with more than just their name in the first session.
- Create an environment in which learners can comment on the proceedings and express their frustrations.
- Praise people for work well done.
- Correct people tactfully.

- Generally pay attention to how people are interacting.

INDICATORS OF POOR USE

- Teacher lectures for more than 10 minutes. Most of us cannot use our voice well enough to sustain listener attention for more than 10 minutes. Moreover, didactic activities can be realised more cost-effectively in audiovisual or print formats.

- Tasks with a heavy visual component, e.g., constructing complex diagrams, are attempted through audioconferencing instead of through other delivery technologies.

- Some learners are not participating, for whatever reason; such behaviour is usually not helpful for total group functioning. Their silence may also indicate a problem area; find out what all participants think about the course.[3]

EXAMPLES

- OISE offers graduate courses, scheduling one 3-hour audioconference per week per course to achieve the peer learning and collegial discourse mandatory at the graduate level. Class size is limited and many break-out group/small group audioconferences are held to promote the maximum participation for each learner and to facilitate a variety of learning activities (Burge & Howard, 1990).

- Schools in New Brunswick and Newfoundland regularly link classrooms in language practice sessions. French-speaking learners from New Brunswick assist Newfoundlanders learning French as a second language; then English-speaking Newfoundlanders reverse roles in the alternate session.

- A consortium of addictions agencies in five provinces offered continuing professional education to addictions workers in which audioconferencing was used to bring outside expertise to over 27 sites (Burge, Smythe, Roberts and Keough, in press).

- There are a number of audioconferencing networks which distribute a variety of audioconference activities. Contact North/ Contact Nord (150 sites, of which 43 are full access sites), Université d'Ottawa/ University of Ottawa (17 sites) and Memorial University of Newfoundland (190 sites in 100 communities).

Notes

[1] The brand name for such a service offered by Bell Canada is TeleForum.

[2] Burge and Snow (1990), for example, discuss what they and others consider to be appropriate cognitive tasks for the medium, and refer readers to established works in the field.

[3] See Appendix 7 for a sample form that might be used.

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Audiographic Conferencing

> Audiographics can greatly enhance an audio-conference, since the system replicates such familiar technologies as the blackboard, the slide projector and the overhead project - all integrated in real time on line, with the added benefit of full interactivity! (Violette, 1993)

DESCRIPTION

An audiographic conference consists of the same components as an audioconference: a telephone or group conference unit, standard dial-up telephone lines and a bridging service. In addition, each site has a standard computer with modem, keyboard and colour monitor with the following special features:

- special software packages which vary in their complexity and features. The Optel TeleWriter and WorldLinx VIS-A-VIS systems are most frequently used by educators[1]

- an electronic tablet and pen which allows the teacher and/or learner to handwrite or draw text or graphics on-line

While there are some differences in the technical features of different brands of equipment, the process by which they facilitate interaction is similar.

- The teacher and learners are able to talk with one another on the audioconference microphones and, at the same time, to keyboard messages on the computer or to draw on the tablet.

- Learning material can be prepared, saved on computer disc and copied to sites in advance. On-line commands then cause each computer in the conference to bring the required materials onto all the screens. The screen can then be annotated from any site to highlight key points using the pen or keyboard.

This basic system can be enhanced by a document scanner, camera, VCR or camcorder depending on the complexity of the software purchased. Graphics can be prepared with currently available software, e.g., PC Paint, Lotus 123, or with a variety of scanners from such sources as videos, slides, pictures, 3D objects and transparencies.

To benefit from all the features of this type of conferencing, the teacher needs training[2] on how to use the graphics packages to create learning materials, and may need the support of a graphics department. Both teacher and learners need training in how to use the equipment effectively during classes. For example, different colours and line widths can be used to annotate materials. Effective training permits the actual conferences to occur with only the operator support described for audioconferencing.

Audiographic systems support visual learning cost-effectively. The combination of text, graphics and audio accommodates a variety of learning styles. Learners and teacher can interact rapidly and flexibly in several modes. Material created on-line, such as notes, sketches, etc., can be saved to the course storage disc. Special guest experts may be brought into class via the audioconferencing component. Learners can communicate with each other easily and informally. The system is relatively easy to operate. Its major constraint is that only still images can be used.

CRITICAL PREPARATION

Review the materials in Part 1 to help you expand these guidelines for appropriate preparation for audiographic conferencing.

- Think carefully about how the audiographic activity integrates with the other course components, such as private studies or field projects with peers. Everyone should feel that their conferencing time is necessary and productive.

- Allow plenty of time to prepare stored disc material and to forward the discs to participating sites.

- Ensure that learners and teacher know how to use the software and equipment; precious class time is not the time to begin that learning process.

- Design the content of some screens so that learners can add information and thus build up a more cognitively complex map of knowledge.

- Ensure that the bridge operator will be able to facilitate fast trouble-shooting.

- Keep a back-up copy of disc material.

INDICATORS OF GOOD USE

Although teachers and learners had different task and social responsibilities in audioconferencing, the addition of audiographics equipment requires similar task behaviours of them.

- Use the pen and tablet during the class in the same way that a teacher or learner uses the chalkboard in a face-to-face class.

- Keep the graphics legible.

- Use the icons (set of boxes) provided in the software to erase, change colours, point and write, or magnify.

- Use the keyboard to type additional material during the class, e.g., a caption for a diagram on the screen.

- Encourage one another to add to or change diagrams on the screen.

- During any explanations of content, use the on-screen pointer to indicate numbers, words, etc.

- Regularly store materials on disc so that they are not lost because of a technical malfunction.

Teachers and learners also share responsibility for a positive social environment.

- Use interaction strategies such as reporting on small group activity, solving problems, discussing a topic or issue, leading a seminar, explaining a complex concept, and/or asking questions of each other, the resident or visiting guest experts.

- Allow plenty of time for questions, reactions or disagreements.

INDICATORS OF POOR USE

- Complex graphics are confusing; simple graphics that relate directly to the oral presentation are most effective.

- Too many learners in one class reduces the opportunities for interaction.

- More than 5-6 learners per computer limits their ability to see the screen and to use the pen, keyboard and other graphics tools.

- Talking while data is being sent distracts colleagues and may interfere with the quality of the transmission.

- Full screens of small print are hard to read; use conventional print materials for dense information .

- Long lectures are inappropriate; silent learners are disconcerting.

EXAMPLES

- The Art Gallery of Ontario and the Royal Canadian Mint have used Contact North/Contact Nord's audiographic facilities to share information with schools about their exhibits and educational activity (McGreal, Simard, Tobin & Violette, 1992).

- Wilfrid Laurier University is teaching 13 courses from business to arts to learners in 3 sites in Southern Ontario (Muncaster, 1993).

- Engineering faculties from Wisconsin to Finland make increasing use of this technology for CADCAM and other content areas (Smith, 1992).

- Some 18 secondary school courses including geography, biology, chemistry, industrial design, and physics have been taught in Northern Ontario using audiographic teleconferencing. Some of these courses have up to 1,200 graphics prepared in advance on diskettes (Violette, 1993).

Notes

[1] The Université d'Ottawa/University of Ottawa uses an electronic whiteboard, which allows the teacher to write on a 'black' board in much the same way as in a conventional classroom. It continues to enhance the capabilities of its equipment with innovative software such as LE PROF and SMART.

[2] Major audiographic networks provide such training through combinations of their staff and prepared materials (see References and Selected Readings).

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Computer Conferencing

> Rather than representing barriers to be overcome..., computer conferencing systems can offer a congenial setting for establishing the technical competence and positive attitudes that lead to adoption and use... Research perspective. (Sweet, Anderson & Halenda, 1991)

> I suffer terribly from 'stage fright' so I dread face-to-face or public speaking contact. I am able (on CC) to compose my answers if I so wish, or I can answer spontaneously. User's perspective. (Sweet, Anderson & Halenda, 1991)

DESCRIPTION

Computer conferencing (CC) consists of three technical elements.

- Individual computer terminals and modems transmit and receive text. They may be PC's or workstations.

- Telephone lines link the terminals.[1] They may be standard, dial-up telephone lines. They generally permit slower speed data transmission, are expensive to use for long distance calls and may cause unacceptable levels of data transmission errors. They may also be lines specially designed for computer data transmission[2] at higher speeds of data transmission, with cheaper long distance costs and fewer data transmission errors.

- Software links the individual computers into an interactive conference. Such software is mounted on the "host" computer, which may be a PC or mainframe computer. A US software program, PARTICIPATE, and a University of Guelph program, COSY, are examples of the software used in education.

CC requires that teachers and learners be fluent in keyboard use (typing); some training should be undertaken if they are not. Training on the particular software to be used in a course is then required. The only other support needed is the computer technician to maintain the hardware and software. Either the technician or the teacher may have to be available to learners at the outset of a course to respond quickly to user problems

CC has a number of strengths:

- It can promote structured learning activities and feelings of group cohesiveness and cultural solidarity. In educational settings, CC may

> ...provide learners with opportunities for convenient course-related or social interaction with peers... enable collaborative group work by distance learners ... facilitate interaction with an instructor ... decrease turnaround time for instructor feedback ... allow learners access to on-line resources, e.g., databases, library catalogues, and course registration ... and enable learners to upload and download assignments and take on-line quizzes and tests ...(Wells, 1992, p. 2)

- CC is convenient for people whose schedules make it difficult for them to attend classes at fixed times. Personal convenience and control over time are two big benefits.

- Learners can take time to reflect and think through a response. To save long distance costs, they can compose and revise messages on their own computer when convenient, then download the file to the host computer at minimal cost.

- The CC environment, where people cannot see or hear one another, may promote equality in discussion. People may not feel intimidated and can contribute when it suits them.

- Apart from the original cost of the software and the provision of computers, CC does not demand extensive staffing, production skills or special technical facilities.

- Learners can reduce their on-line costs by downloading messages, without reading them, into their own files. Files can be read on the computer screen, or in print, once the long distance connection is broken.

- CC appeals to people who like to be on their own physically but connected to others cognitively and emotionally.

Computer conferencing may be used for these specific learning activities, especially if it is integrated with other resource materials

- seminars
- small group activities
- role plays
- debates
- assignments
- simulations
- guest expert visits
- whole class discussions
- problem solving

CRITICAL PREPARATION

Review the materials in Part 1 to help you appreciate and enlarge upon these guidelines for appropriate use of computer conferencing.

- Ensure that learners have easy and regular access to a computer and modem, as well as to the most cost effective long distance services.

- Train learners to use the software before they deal with the content of the course.

- Ensure that a technician is available for support immediately before, during and after your initial series of conferences.

INDICATORS OF GOOD USE

Learners should be scrupulous in ensuring that they understand the goals, objectives and protocols of the computer conference activities. Colleagues will not readily tolerate digressions from important topics.

Critical task behaviours for teachers, who function as conference moderators, are not dissimilar to those required for the effective use of audio or audiographic conferencing.

- Have clear objectives for the interactions. People must feel that their on-line time is well spent.

- Plan a structure of subconferences that focus on specific topics; organization helps to keep messages linked.

- Keep your messages concise, on-topic, and preferably no longer

than one screen, or 10 lines. One idea per paragraph is the maximum.

- Negotiate an acceptable grammatical style (and rate of errors) at the outset of the course.

Critical social behaviours for teachers/moderators and learners are similar.

- Use informal and courteous responses, directions and questions; they read better than a staccato, formal style.
- Introduce yourself and the conference rationale.
- Have learners introduce themselves to each other.
- Encourage people to keep up with the messages. Information overload can be daunting!
- Use learners' responses constructively. Learners will feel respected and included.
- Model the appropriate writing style. In some subconferences it can be very informal, e.g., for socializing; in others, it may have to be more formal and well argued, e.g., for substantive discussions about course content.
- Encourage people to talk across you to each other.
- Use humour when you know the group very well.

INDICATORS OF POOR USE

- Learners contribute messages that, however brilliant, have become out-of-sync with the class discussion.
- They lurk silently as read-only learners.
- They send long rambling messages that cannot easily be linked to others.
- The moderator loses control of the discussion, or abdicates some of the above responsibilities.

- Learners frequently seek technical help in using the software. Such requests are symptomatic of problems such as insufficient advance training or poor choice of software.

EXAMPLES

- OISE has offered courses since 1985 toward a master's degree in education. Typically, 10-15 learners, located across wide distances, enrol in the courses. The PARTICIPATE software program is used because of its e-mail and conferencing capabilities (Davie & Inskip, 1992; Davie, 1989).

- The Village Electronique Francophone (VEF) is a privately owned computer conferencing system available throughout Canada since 1989. The Village works in close partnerships with a number of different groups in Ontario and other provinces. Its objectives are to support the evolution of distance education and "tele-commuting", [and] to support literacy projects and computer literacy initiatives. One of its activities is the "Creating a Culture for Change" project of the Ontario Teachers' Federation (Thomas, 1993).

- Contact North/Contact Nord implemented a computer conferencing system in 1987 to facilitate project administration. Site coordinator meetings are held by CC, and e-mail is used extensively (Sweet, Anderson & Halenda, 1991).

Notes

[1] Computer conferences that take place within a closed user network (e.g., a business office) use specially installed telephone cables called LAN (Local Area Network), WAN (Wide Area Network), etc.

[2] The telephone companies provide such a service under the product name Datapac. Speeds range from 300 to 9600 baud.

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Compressed Videoconferencing

> It (the technology) allows me to be innovative and creative in presenting my material.
> Comment from a teacher (Samson, 1993)

> The technology is interesting for the first couple of classes. After that, I don't even realize the teacher is not in my classroom and I'm focused on learning and making the best marks I can.
> Comment from a student (Samson, 1993)

DESCRIPTION

The videoconferencing configuration which we will consider is symmetrically interactive voice and moving image between two or more sites.[1] It can be "full motion" or "compressed".

"Full motion" requires a full television channel (the equivalent of about 1,200 telephone lines) for each site that transmits a video signal. This approach gives the illusion of full or natural motion as we are used to seeing on television or on a videotape.

"Compressed video" enables interactive conferencing with as few as two or as many as 24 digital telephone lines. What is lost in squeezing the video information together is the clarity (naturalness) of the motion. The fewer the number of telephone lines used, the "jerkier" or less natural the motion looks.

The equipment being used by educators includes[2]

- a minimum of one camera, a television monitor (typically 20"), a Codec (video encoder and decoder), and a control unit for panning, tilting, and zooming the camera at each site. Most vendors sell all these elements packaged on a cart that can be wheeled from room to room.

- two 'switched 56' digital telephone lines

- a mechanism for linking the sites, which is usually provided by the telephone companies[1]

As in the audiographics conferencing, the teacher will need training well in advance of the start of a course to prepare materials and to

learn the strengths and limitations of the medium. Usually, a second person is required in the classroom to operate the control unit. A student may perform that function with suitable training. A technician is needed to service equipment. The compressed video bridges do not have operator assistance, so the teacher, the control unit operator and the learners will have to resolve problems as they occur.

Compressed video offers symmetrical learning at far less cost than full motion, multipoint video conferencing. However, it is quite new, so some of the selected readings relate to other video technologies; they are our only starting point as we experiment with compression.

Compressed video may be used when limited moving video input is needed for applications such as

- to show case-study material
- to conduct role plays
- to demonstrate interview techniques
- to present information requiring high quality graphics or limited movement

The visual presence of others who are geographically distant creates a strong sense of social presence and may create the warm environment which some need. Visual presence does not add much in strict cognitive terms.

CRITICAL PREPARATION

Review the materials in Part 1 to supplement these action oriented guidelines for appropriate preparation of learning using compressed videoconferencing.

- Ensure that all sites have the appropriate digital service, i.e., usually, switched 56. Even large urban centres can have gaps in the service coverage.

- Plan to have a technical facilitator at each site to operate the control unit, and, if possible, train each one before the class starts.

- Think about how different visual resources will be integrated. You have many potential resources: the learners, video cassette extracts, graphs, diagrams, photographs, slides, etc. Inserts of

graphics and visual material add variety and help understanding.

- Design and use graphics to conform to these guidelines.
  Use pastel coloured, not white, paper.
  Keep messages simple and use large-sized letters.
  Display text material (e.g., a chart or list) long enough for a slow reader to read.
  Display non-text material (e.g., a cartoon or photograph) only for 3-4 seconds.

- Review audioconference guidelines on interpersonal interactions as they are fundamental to fostering interaction in compressed videoconferencing.

- Give some attention to camera use. Experiment with camera angles, shots and visual inserts so that on-screen images are steady, in focus, well-composed, and interesting. Remember that learners are used to high quality camera use on commercial television.

- If you plan to use graphics, establish two automatic pre-set camera positions; one for the graphics and one for the people.

- Vary camera shots judiciously. Some that work particularly well are: Mid close-up (begin at waist level), Full figure shot (entire body), and Wide angle (for a group shot).

- Close ups do not work well. Although the person does not seem to move much, there is still a lot of motion from the camera's perspective: eyes blinking, hand moving, taking notes, shift in chair, etc.

- Pay attention to lighting.
  Fluorescent lighting is usually adequate for educational use.
  Additional soft lighting which highlights faces and breaks up shadows will improve the image.
  Consider using any kind of portable lighting.

INDICATORS OF GOOD USE

Teachers and learners need to observe the following task protocols.

- Be prepared to learn how to use the videoconferencing effectively

and what behaviours are required of you to meet the viewing needs of colleagues at other locations.

- Behave as naturally as you can, sit directly in front of the camera and look it when talking. Such behaviour will give colleagues at other sites the impression that you are talking directly to them. Gaining a sense of social presence is a major reason why we use this technology.

- Do not move around too much, or too quickly. The equipment cannot transmit rapid movements without some loss of naturalness, and people may move out of range of the camera.

- Change the camera shots carefully so that viewers don't become 'seasick' with rapid or unpredictable shots.

- Compose the picture on the screen as well as you can; avoid expanses of table tops or 'busy', cluttered backgrounds.

- Avoid the use of too much white in the background. Add pastel drape, otherwise the auto focus on the camera will concentrate on the white background and not transmit clear pictures of people in the foreground.

Critical social behaviours for teachers and learners are needed to supplement these task protocols.

- Expect to participate in two or three sessions before you feel comfortable. Use the first sessions as learning experiences. For example, pre-set camera shots can be established to minimize panning and zooming during a course.

- Speak directly to your fellow learners; don't address all comments through the teacher.

- Facilitate the technical process by commenting on issues that need to be resolved. There is no need to feel frustrated. Problems can be resolved but only if you give the feedback: no one sees and hears what you do and won't know unless you tell them.

- Don't wear clothes with stripes or 'busy' patterns as this will cause the camera's focus to oscillate and the picture will not be clear. Be courteous and dress appropriately.

- Don't make noises such as tapping a pen on the table top or rustling paper as they will be transmitted by the built-in microphones and are disturbing to others.

INDICATORS OF POOR USE

- The picture keeps breaking up; there is too much motion or pattern for the compression to handle.

- Graphics cannot be easily read or pictures seen; the material is poorly designed and inappropriately dense.

- People cannot recognize one another; the camera is too far away from them.

- Lecture portions during the class last more than 10 minutes. 'Talking head television' loses learner attention very quickly.

- The teacher seems to be giving a speech to someone "out-there", or is looking sideways as if the listeners were not there. Camera phobia is a common and easily resolved issue.

- The teacher or technical facilitator at a site dominates the screen or microphone. Participation should be equal.

EXAMPLES

• Memorial University of Newfoundland (Telemedicine Centre) has been teaching social work and pharmacy in its trials of compressed videoconferencing.

• Université d'Ottawa/University of Ottawa (Distance Education), in collaboration with institutions in Toronto and Sudbury, will be teaching courses in speech therapy and education to Franco-Ontarians in September 1993.

• The University of Alberta (Department of Educational Administration) is offering courses in a wide variety of subjects, e.g., Slavic and Eastern European studies, transportation, business administration, nursing and education.

• The Collège de l'Acadie in Nova Scotia used 6 video sites to teach courses in 4 professional and technical training programmes in

1992, and plans to increase its usage to 9 programmes in 1993 (Samson, 1993).

- The McLuhan Program in Culture and Technology at the University of Toronto taught a graduate course to learners at the University of New Brunswick on 'The New Media and Policy' in the winter semester, 1993.

Notes

[1] There are other types, such as Business Television (BTV) which consists of one-way moving image and two-way voice, that are not symmetrical.

[2] Compression Labs, PictureTel and V-Tel are sold by a number of different vendors in Canada.

[3] Most pilot projects are point-to-point, however, and thus do not require a bridge.

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Conclusion

We have presented some practical guidelines for maximizing the effectiveness of four symmetrical, interactive technologies. Should you wish to read more about general issues affecting all technologies and/or about technologies other than those covered in this guide, the following list of selected readings should get you started.

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Appendices

1 Tessmer & Jonassen Taxonomy of Learning Strategies
2 Alberta Taxonomy of Learning Strategies
3 Audioconferencing: Guidelines for Teachers
4 Managing Controversy
5 Levels of Learning Outcomes
6 Designing Distance Mode Courses
7 How Well is the Class Functioning?
8 Example of a Course Evaluation Form

Appendix 1 Tessmer & Jonassen Taxonomy of Learning Strategies[1]

PRIMARY STRATEGIES

Information Processing Strategies
To control cognition, and therefore to produce learning

- **Recall**
  learn lists of information
  chunk
  organize
  practice
  use mnemonics

- **Integrate**
  make it more memorable
  paraphrase
  find examples
  accretion or change for learner's schema

- **Organize**
  assess how new ideas relate to previous knowledge
  categorize
  outline (formulate visual map of ideas and subsuming categories)

- **Elaborate**
  add extra information to new information to make it memorable
  generate implications or inferences about new information
  create sentences to link ideas into coherent propositions

Active Study Strategies
To process given print-based instructional resources

- **MURDER** (sequenced activity)
  set Mood
  read to Understand
  Recall information without text
  amplify to Digest
  Expand knowledge
  Review errors

- **SQ3R**
  Survey
  Question
  Read, Review, Recite

- **Underline**
  to focus attention

- **Take notes**
  to select key ideas
  to paraphrase

- **Summarize**
  to paraphrase

SUPPORT STRATEGIES

Metalearning Strategies
To monitor cognitive processes and to respond to various learning tasks with appropriate strategies, i.e., to monitor, not produce, learning

- **Plan**
  select goals
  activate memory schemata
  assess depth of processing required
  estimate processing demands for the task

- **Attend**
  focus on instructional materials
  search memory for relevant information
  contrast new information with memorized information
  validate new information by confirming with old

- **Encode**
  clarify and elaborate new information

- **Review**
  confirm correctness of learning
  repeat new learning via recall and practice
  revise as needed

- **Evaluate**
  assess clarity and coherence of instructional materials
  determine the relative importance of new information

Preparation and Execution Strategies
To create optimal psychological conditions

- **Preparation strategies to establish mood**
  relax (for concentration)
  reduce anxiety (about new information)

- **Execution strategies**
  manage concentration
  manage time
  set up goals to assess progress of learning

Appendix 2 Alberta Taxonomy of Learning Strategies[2]

- **Understand Self as Student**
  Develop confidence in one's ability to learn
  Establish short and long term goals
  Develop insight into own learning style
  Accept responsibility

- **Manage Self as Student**
  Maintain health of mind and body
  Manage time

- **Understand the Learning Environment**
  Use the complete services and resources
  Create conducive home environment
  Access other resources

- **Use Various Methods**
  Learn on own
  Learn in group
  Learn by doing
  Learn by self direction

- **Think Practically**
  Apply creative thinking
  Apply lateral/divergent thinking
  Apply convergent thinking
  Apply critical thinking
  Apply analytical thinking
  Apply logic/reason

- **Recall and Apply Data to New Situations**
  Use recall techniques
  Apply knowledge

- **Apply Problem-Solving Techniques for Rational Decisions**
  Identify problem
  Collect information
  Establish decision parameters
  Generate alternatives
  Evaluate alternatives
  Make decisions, and evaluate results

Appendix 3 Audioconferencing: Guidelines for Teachers

The following guidelines are designed to

- help you have a productive time
- help you develop a "presence" on-line
- share the responsibility for a good session amongst all participants

The guidelines are based on the assumptions that (i) the medium is best used for continuous interaction and not for traditional lecturing; and (ii) people's attention to a single voice is limited to approximately ten minutes.

MANAGING TIME

- **Check equipment**
  Check out the equipment well before the start of the session.

- **Set a time agenda**
  Set the agenda with participants before you get into substantive work.

- **Be time aware, not time constrained**
  Ask a participant to help you in monitoring time.

- **Organize the transmission of information**
  Present information in chunks of six or seven minutes. After that time period, attention will likely be reduced.

BEATING TECHNOPHOBIA

- **Rehearse**
  Experiment with the equipment and know how to use it before the first audio session.

- **Introductions**
  Ensure that people introduce themselves in the first session. As they do so, write all names in front of you as a site diagram of the conference.

- **Confirm transmission quality**
  At the first meeting, check that participants can hear each other clearly, and don't waste time later with questions such as "can everyone hear me?" You'll be told if they can't.

- **Personal Names**
  Use names as often as possible; it is unnecessary to refer to the site location.

MANAGING TALK

- Assume that everyone can hear you.
- Develop an informal protocol or rules for turn-taking that allows people to interiect easily.
- Don't allow a "talker" to dominate; say, "Let's get others' ideas here: Anyone else?"
- Avoid asking questions that call for a "yes" response; it is more time efficient to reverse the question so that fewer people have to reply.
- Encourage participants to talk across you to each other on-line. This avoids one-to-one conversations between you and a participant that exclude others. Correct people if they persist in addressing all comments to you when this habit is inappropriate.
- Keep group work segments to forty-five minutes to one hour off-line or at least with audioconferencing equipment turned down so that groups can work without being heard by others elsewhere.
- Restrict small group activity reports to three to five minutes and arrange for a listening group to give a critical response. Set the expectation that these reports should be presented with structure.

DEALING WITH THE INVISIBLE

- Use first names as often as possible for quick identification and group bonding. Try to be as aware as possible of what your voice sounds like without the benefit of visual communication cues. Sighs or monotones or slow speech can carry negative connotations.
- Use metaphors and analogies. Like scenes from a movie they help people to "get the picture". This is especially helpful for people whose styles of receiving and storing information are more visual than verbal.

- Don't panic at silences. With a well organized agenda, silence usually means people want time to think or plan a reply. Simply say, "I'll wait for a response: it's OK to take your time".

FEELING PRODUCTIVE

- Keep administrative and housekeeping details to a minimum; people are on-line to talk, produce, and learn. Get into substantive topics as quickly as possible after a short time for "entry" into the class. Reserve the final ten minutes of each class for unanswered questions and for housekeeping.

- Brevity, sound effects, silences and humour provide energy. Plan for both on and off-line activities during the session.

- Beware of topic digressions. Rambling around a subject will lose the group's attention very quickly. Ask participants to watch for this problem.

- Encourage the asking of questions, but leave enough time for adequate answers.

- Acknowledge participant contributions in a substantive way; a rather distant sounding "aha" or "that's good" can sound off-putting without the benefit of visual cues. Give a directed comment on contributions.

- Ensure that you get public feedback on the group process at the end of the first session: it's your best chance to flush out any potentially serious problems. For example, some people in one site may be feeling annoyed with the noisy behaviour of peers; others at another site may be feeling left out because of the interaction styles.

- Make sure everyone knows the time and structure of the next session.

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Appendix 4 Managing Controversy[3]

Controversy tends to result in:

> Greater student mastery and retention of the subject matter... Greater ability to generalize the principles learned... Higher quality decisions and solutions to complex problems... More frequent creative insights... Greater exchange of expertise... Greater accuracy in understanding the perspectives of others... Greater task involvement... More positive relationships among participants... Higher academic self-esteem... (Johnson & Johnson, 1992, pp. 126-127)

Certain skills are needed by learners:

> collect, analyze and present evidence to support a position... evaluate and criticize the opposing positions... see the issue from both perspectives... make tentative conclusions based on a synthesis and/or integration of the best evidence from both sides. (Johnson & Johnson, 1992, pp. 127-128)

Learner's tasks in handling controversy are to:

> research and prepare a position (reasoning both deductively and inductively); advocate a position (thereby orally rehearsing the relevant information and teaching their knowledge to peers); analyze, evaluate critically, and rebut information; reason deductively, inductively, and probabilistically; take the perspective of others; and synthesize and integrate information into factual and judgemental conclusions that are summarized into a joint position to which all sides can, hopefully, agree. (Johnson & Johnson, 1992, p. 129)

Appendix 5 Levels of Learning Outcomes

- The Affective Domain
- The Cognitive Domain
- The Psychomotor Domain

S1

The Affective Domain

Lower Levels of Learning (simple) ↔ Higher Levels of Learning (complex)				
Receiving	**Responding**	**Valuing**	**Organizing**	**Characterizing**
(early awareness & selective attention)	(willing attention and satisfied reaction)	(internalized values with consistent supporting behaviour)	(integrating different values into a coherent whole)	(new behaviours – ba on value organizatio – are consistent and characteristic)
Ask Choose Describe Follow Give Identify Locate Name Request Select Use Volunteer	Assist Attempt Comply Discuss Help Perform Practice Read Request Select Write Volunteer	Choose Complete Demonstrate Describe Distinguish Explain Follow Initiate Invite Join Justify Report Share Suggest	Accept Arrange Change Combine Compare Complete Defend Explain Generalize Identify Integrate Organize Recognize Select Synthesize	Act Defend Demonstrate Distinguish Influence Maintain Mediate Perform Question Revise Show Solve Use Verify
Listens carefully	*Voluntarily does something*	*Actively shows concern about something*	*Accepts responsibility for own behaviour and personal strengths*	*Shows self-discipline a initiative in a variety o contexts*

Summarized by Liz Burge, using Gronlund, N.E. (1991). *How to write and use instructional objectives* (4th ed.). New York: Macmilla

The Cognitive Domain

Lower Levels of Learning (simple) ↔ Higher Levels of Learning (complex)					
Knowledge	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
(recall)	(understand in own words)	(use in actual contexts)	(break down into components to understand structures)	(form new patterns and structures)	(judge value using criteria)
Define Describe Identify Label List Locate Quote Recite Repeats Restate Select	Convert Defend Distinguish Explain Generalize Give Examples Paraphrase Predict Summarize	Apply Calculate Compute Demonstrate Draft Dramatize Draw Estimate Manage Manipulate Operate Practice Prepare Produce Schedule Solve Use	Categorize Diagram Differentiate Discrimate Distinguish Illustrate Select Separate Sort Subdivide	Combine Create Design Devise Generate Organize Plan Reorganize Revise Write	Appraise Compare Contrast Conclude Critique Evaluate Judge Recommend
Repeats another's definition of a principle	*Explains a principle, using examples of its use elsewhere*	*Personally applies that principle to procedures in a real situation*	*Can separate a fact from an assumption in that principle*	*Combines several principles into a new operating strategy*	*Judges the use of that new strategy*

Summarized by Liz Burge, using Gronlund, N.E. (1991). *How to write and use instructional objectives* (4th ed.). New York: Macmillan.

The Psychomotor Domain

Lower Levels of Learning (simple) ↔ Higher Levels of Learning (complex)

Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
(get cues to guide actions)	(readiness to act)	(early learnings of skills)	(habitual responses and efficient performance of less complex skills)	(expert and fast performance of complex skills)	(adapts skills as necessary)	(creation of new movements)
Choose Detect Distinguish Identify Isolate Link Select Separate	Display Explain Point to Proceed Show	Adjust Assemble Build/Construct Calibrate Close Dismantle Dissect	Disconnect Draw Duplicate Fasten Grind Heat Load Loosen	Manipulate Mend Open Organize Sort Replace Rotate Select	Adapt Change Modify Rearrange Revise Reorganize	Create Compose Construct Design Originate
Sees how a technical procedure is set up	*Shows correct handling of an instrument*	*Practices a simple procedure*	*Consistently and correctly carries out a simple procedure without supervision*	*Easily and correctly handles more complex tasks*	*Adjusts use of instruments according to different contexts*	*Creates a new procedure*

Summarized by Liz Burge, using Gronlund, N.E. (1991). *How to write and use instructional objectives* (4th ed.). New York: Macmillan.

Appendix 6 Designing Distance Mode Courses

As we suggested in Part 2, the teaching methods which we use as face-to-face teachers of adults remain basically the same when we use conferencing technologies. We may have to modify them to fit the needs of the distance learner and of the communication technology that we are using. We must still focus on class dynamics, with the added complication that the learners' body language is not visible in the same way as in a face-to-face classroom.

The development of distance mode courses follows a six step planning process.

1 **Determine learning needs**
2 **Assess technical support requirements**
3 **Design learning objectives, resources, activities, teacher functions**
4 **Develop the course manual**
5 **Set up support structures**
6 **Monitor course progress**

THE FIRST STEP: DETERMINE LEARNING NEEDS

Our best advice here is to seek a balance between the specified academic requirements and the learners' expressions of interest. Learner involvement in clarifying the needs for the course will enhance their commitment.

Hannum makes some useful comments with regard to determining learning needs:

> Studies have shown that students make good choices about the pace of the instruction, the amount of practice, and whether to see an overview. Students with high levels of prior knowledge of the content make good choices about the instructional strategy; students with low prior knowledge do not. In general, students make poor choices about sequencing topics, whether to have any practice, and the difficulty level of the practice. A number of studies has shown that learner control can be more effective if the learners are given some guidance about how to use learner control options. (Hannum, 1990, p. 8)

THE SECOND STEP:
ASSESS TECHNICAL SUPPORT REQUIREMENTS

Before you come to any conclusions concerning the best type of media to use if choices are available, let's consider three key aspects about media.

Cost Effectiveness

The first key aspect is cost. What are the most cost effective ways of transmitting or discussing information?

- Prepared print materials can be faxed, or photocopied and sent by mail; audio cassettes can be made and/or altered quickly. Neither is expensive.

- Audioconferencing using bridging equipment owned by education institutions or shared by consortia can be done at very low cost.

- Simply-produced videos taped by a camcorder or similar equipment are also inexpensive; elaborately produced video or television productions are costly.

- Computer conferencing and data transmission are inexpensive if everyone has access to a computer, modem and Datapac.

Content and Format Choices

What then are the best formats for helping learners work with the information once it has been transmitted? We know that peer coaching and peer learning happen best in contexts where people get attention, feel safe enough to be tentative and to explore, hear about comparable experiences, and get constructive and fast feedback. The four conferencing technologies, when properly designed, will provide that context, although the time delay in responding via computers is a factor that must be considered.

What can each form of media do best? What functions are appropriate for each one? How user friendly is each? More information about what we have learned from research regarding the effectiveness of the various technologies may be found in the References and Selected Readings sections in Parts 1 and 2.

Integration of Modes

Variety in the use of media will prove an effective means to encourage interaction in any distance course. Print, audio or video cassette could be used to carry the basic information, then one of the conferencing technologies could be brought in to encourage interaction about that information and about participants' experiences. In fact, the variety of possible formats is limited only by the creativity of the course designer/instructor and the resources available.

THE THIRD STEP: DESIGN LEARNING OBJECTIVES, RESOURCES, ACTIVITIES AND TEACHER FUNCTIONS

What Kind of Objectives?

Despite the current debate about the usefulness of very specific behaviour objectives, we believe that it is useful to at least outline what the learners need to be able to do and know by the end of the session.

Global phrases such as "understand methods of student evaluation" do not help anyone to be clear about the required learning outcome. The more descriptive phrase "...will be able to explain the key principles of formative and summative evaluation, and apply them with some confidence in curriculum development" is more specific. The objective can also be framed as a question to help learners assess their own learning.

Be sure to design a range of learning objectives, from simple to more complex levels. Ensure that you have a balance of theoretical and applied objectives. Learners need to know how to successfully apply new information, but they also should be able to articulate the concepts and principles behind that application.

Information Resources

Information resources can be both human and material. Where are your best sources – are they likely to be in print or audiovisual format, or does the information reside in experts who need to be brought in live? Do your learners already have access to printed information or does it need to be prepared?

Guest experts can be brought in at various points during your course,

but their "arrival" times are most often at the introductory stages or at the analysis-of-application stage. For the introductory stages, the guest can be invited to contribute printed materials or to participate in an interactive conference. For the analysis-of-application stage, the guest can be invited to listen to the learners' reports and confirm, correct, and challenge as appropriate.

Teacher Functions

We believe in the facilitative approach: the guide on the side, rather than the sage on the stage.

This approach calls for six key facilitative behaviours by the teacher and the preparation of a manual for use by both learners and teacher. If the learners are working from a manual containing directions for individual and group activity (see Step 4 below), the key behaviours of the teacher are to:

- create the climate and negotiate ground rules
- connect learners to peers and other resources
- confirm new learnings and insights
- correct misunderstandings
- change the agenda or activities as necessary
- challenge learners to more sophisticated thinking or applications

How Do We Know if Learning has Occurred?

How can the learners articulate and claim their learning? How can they provide evidence of that for the facilitator to assess? In addition to formal evaluation of learning outcomes, the assessment may be informal via open questions, oral group reports on project work or group discussions, or written work for feedback. In an audioconference, the teacher can hear what learners have learned as she/he listens to them reporting and talking to each other. A dominant presence by the teacher will reduce the potential for formal and informal talk between learners, so we suggest that this person adopt an active listener stance and insist that learners talk to each other and not exclusively to her or him.

How Many Sessions do We Need?

This decision will depend in large measure on the complexity of the topic chosen. Sufficient sessions have to be offered so that learners

can thoroughly assimilate the basic information, then work it through with others via in-class questions, discussion with colleagues and readings.

How many guest experts will be necessary? What is the best time of day to hold the sessions? Which day of the week is best? What is the optimum number of learners? A class using any of the conferencing technologies should have no more than fifteen to twenty learners. If you have more than that, it is too difficult to keep track of them and for learners to talk. Since you cannot see your learners, it is all too easy to forget about a quiet person.

Is Any Academic Preparation Needed?

Some learners may require extra preparation to be successful. The instructor should tactfully assess and discuss the level of learners' study skills such as reading, library research, management of personal time and commitments, and their literacy in reading, use of the computer and writing papers.

THE FOURTH STEP: DEVELOP THE COURSE MANUAL

The best scenario is to prepare and distribute course materials in advance so that learners can arrive with some knowledge, and are prepared to discuss the subject matter with the other learners. Well designed materials sent to learners several weeks before the course should encourage them to at least skim over the material. They may also serve as valuable reference materials long after the course is over, especially if the learning activities are designed so that learners can record the work of their peers.

In designing course materials, especially if you are presenting a complex topic, we suggest that you produce a manual containing two sections. The manual should be written for use by both participants and teacher. The following guidelines clarify what we mean.

Organizational Information

The first section will usually contain the following elements

- generic elements pertaining to learning via audio, video and/or computer conferencing, including guidance for telephone and

computer work and small group activity, and statements of responsibilities for learners and teachers

- as much information as possible on library services available from university, college, school and/or public libraries, or any other resources in the community

- broad introductions to the course, including a few words of greeting from the organizers, an outline of the content, biographies with photos of the guest experts, acknowledgements of help, etc.

- a table of contents with pagination designed in such a way that additions can be made without undue disruption of the numerical sequence

Individual Session Components

The second section will usually contain the descriptions for each session in the course. Consider describing each session using the following components

- a title which is concise, accurate, and as snappy as possible

- a brief introduction to the content of the session which will grab the reader's attention and interest. This introduction could take the form of a quotation, some questions, a problem with a solution, or some provocative comments relevant to the topic

- an outline of the learning objectives so that they describe as accurately as possible intended learning outcomes. A narrative paragraph is more informal than objectives in point form

- a description of the activities for each session so that the learners know what to expect and how to prepare themselves. Separate the activities you want the learners to do by themselves, alone and before they meet as a group, from the activities all learners do in large or small groups. The individual pre-session preparatory activities should focus on knowledge acquisition. A list of questions to think about during the preparatory activities or tasks to accomplish is useful.

  Try to design in-class activities that focus on helping learners

confirm or correct their new learning, share experiences, discuss the results of their reading and thinking, or generally solve problems

- a list of the resources the learners need for each session, with a separate listing of any additional resources which can be followed up later on. Indicate the location of these extra materials so learners can obtain them easily. Avoid asking people to obtain materials which are not held in convenient locations

- the key readings needed for the session. Their participation will likely be enhanced if they are encouraged to discuss their readings with their peers before the sessions

- the sheet "How well is the class functioning?" (Appendix 7) to distribute to learners after two or three sessions.

THE FIFTH STEP: SET UP SUPPORT STRUCTURES

Library Materials and Staff Services

It is important to ensure that planning includes facilitating access to library services by learners. This planning may involve a call to a local university, college, school or public library or making special arrangements with a library elsewhere. We emphasize this planning task so you can avoid any unnecessary frustrations for the learners and so that library staff are encouraged to be active partners.

Local Sites

Another important task is to set up, or reserve, the local sites for each session and the appropriate technical facility to link them simultaneously, e.g., an audio or video bridge. Each site should be not only physically comfortable and quiet but should have, as far as possible, a range of communications media, e.g., fax, computer, telephone, audiographic device, video and audio cassette players, overhead projector and flip chart. In some areas, for example, Northern Ontario, such facilities may be already in place. In other areas, you might have to establish your own facilities or work with vendors to use their shared-service facilities.

Once these local site arrangements are made, then it is critical to send out the materials needed for sessions as early as possible, and to

confirm learners' attendance. Each learner must know at least several days before the first class exactly what she/he is required to do, and where and when to meet colleagues.

Contingency Plans

Finally, because Murphy's Law applies to educators, check and double check all technical arrangements and have a contingency plan prepared in case circumstances dictate that you have to change the format of one or more of your classes. For example, you may be holding your sessions during the winter. Severe storms could well affect the quality of the telephone lines, a situation beyond your control, or people might not be able to travel to the audioconferencing site.

We have found that, in these circumstances, it is best to acknowledge reality and if all agree, cancel the class. Individual learners can either go home to a warm fire or continue working at the local site.

THE SIXTH STEP: MONITOR COURSE PROGRESS

Informal Feedback

Never assume that because you designed the course it is running well! Learners must be given time and encouragement to give each other fast and informal feedback on how they are feeling about the experience. We suggest that you leave a ten-minute space at the end of each session to solicit open discussion about what is working well and what is not working well in the opinion of the learners (see also Appendix 7). Be prepared to take their views seriously, and to adjust the course design accordingly.

This process does not mean, however, that you have to take the entire responsibility for the ensuing sessions. You should find ways of helping the learners take equal responsibility for the usefulness and success of the course.

Formal Feedback

In addition to this on-going monitoring, you will probably want to collect summary feedback from learners in written form. In Appendix 8, you will find an example of such a form.

Appendix 7 How Well Is The Class Functioning?

Audio conferencing works well when everyone involved shares the responsibility for the productivity and comfort levels of classes. Use the checklist below to assess how your class is functioning.

If you find that you have ticked some "rarely" boxes, then we advise that you take some action: either talk directly with class members or express your concerns in class and explain which aspects of the group dynamics are not working well for you.

If you don't feel comfortable talking in class about the problem, call the Distance Learning Office of OISE-Toronto.

You have a right to expect, and get, interpersonal dynamics that help you have a good experience in the course.

	Not Applicable	Rarely	Sometimes	Usually
1. The sound quality is fine	1	2	3	4
2. The goals for discussion are clear	1	2	3	4
3. Small group activities are useful	1	2	3	4
4. My small group works well together	1	2	3	4
5. I have enough opportunity to contribute to class	1	2	3	4
6. I can talk easily with classmates without the instructor interrupting	1	2	3	4
7. My contributions are acknowledged either by classmates or the instructor	1	2	3	4
8. I get my questions answered adequately	1	2	3	4
9. There are no dominant speakers controlling the discussion	1	2	3	4
10. The instructor doesn't talk too much during discussion	1	2	3	4
11. Language and ideas are gender-inclusive	1	2	3	4
12. I enjoy class sessions	1	2	3	4
13. Other:				

Appendix 8 Example of a Course Evaluation Form

The Ontario Institute for Studies in Education (Affiliated with The University of Toronto)

PARTICIPANT FEEDBACK

Course # _____ Title_____

Date of Completion _____

This questionnaire enables you to assess and comment on your experience of the course and offer suggestions for improvements in course design and in course services. Your responses may also help you to identify some of your own learnings and your contributions to the course.

Please be as frank as you like. Your responses are completely confidential; they will be seen only by Distance Learning Office staff. The course instructor will be given a word-processed aggregate of the responses, but only after the grade submission deadline.

Please return the questionnaire in the envelope provided by the end of next week.

The first eight questions focus on your experience of the course.

	Not very Useful	Somewhat Useful	Very Useful
1. The information about audioconferencing in the manual was	1	2	3
2. The guidance given in the manual for my reading and thinking about course topics was	1	2	3
3. The interaction between myself and the other students generally was	1	2	3
4. The interaction between myself and the instructor was	1	2	3

Comments?

5. Indicate your experience with each of the following during the course (Circle one number in each line):	Never	Rarely	Some-times	Almost always	N/A
a) Were the learning objectives clear?	1	2	3	4	❑
b) Were the learning activities useful?	1	2	3	4	❑
c) Was some choice provided for					
i) class activities?	1	2	3	4	❑
ii) assignments?	1	2	3	4	❑

d) Did the instructor give you opportunities to ask questions?	1	2	3	4	❑
e) Were there opportunities to apply personal life/work experience to course work?	1	2	3	4	❑
f) Were there opportunities to apply course work to your own work experience?	1	2	3	4	❑
g) Were adequate resources available from					
i) the instructor?	1	2	3	4	❑
ii) the library?	1	2	3	4	❑
h) Was there encouragement to think about new perspectives?	1	2	3	4	❑
i) Did the instructor					
i) appear concerned that you understood the course material?	1	2	3	4	❑
ii) respond to questions/requests?	1	2	3	4	❑
iii) maintain high academic standards?	1	2	3	4	❑
iv) give helpful feedback in class?	1	2	3	4	❑
v) give helpful feedback on assignments?	1	2	3	4	❑
vi) adjust the pacing to your needs?	1	2	3	4	❑
j) Were your responsibilities to help in keeping the class productive made clear?	1	2	3	4	❑

Comments?

6. To what extent did you feel the instructor was available for consultation outside the formal class period?	Never	Rarely	Some-times	Usually	N/A	
	1	2	3	4	❑	

Comments?

7. How much do you think you have learned about the subject knowledge of the course?	Very Little					Very Much
	1	2	3	4	5	

8. To what extent do you feel you exercised each of the following six participant responsibilities?	Very Little				Very Much
a) coming to classes prepared	1	2	3	4	5
b) respecting the experience and knowledge of class peers	1	2	3	4	5
c) contributing to class discussions	1	2	3	4	5
d) accepting praise and helpful suggestions	1	2	3	4	5
e) helping class activities to be useful	1	2	3	4	5
f) speaking up if things were not going well	1	2	3	4	5

The following five questions focus on library services:

9. Did you use any library services during the course?

	Never	Rarely	Some-times	Often
I requested specific books	1	2	3	4
I requested specific journal articles	1	2	3	4
I requested information without knowing specific titles	1	2	3	4
I requested a computer search	1	2	3	4
I used the ELOISE online catalogue	1	2	3	4
I consulted with a librarian	1	2	3	4

10. There is a section on library use in your course manual.

Did it provide the information you needed? Yes ❑ No ❑

Would you have liked more information on library use and services? Yes ❑ No ❑

11. If you talked with a librarian, how do you feel about the services you received?

Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied	Did not talk with a librarian
1	2	3	4	5	❑

Comments?

12. Did you use the ELOISE online catalogue? Yes ❑ No ❑
If yes, how satisfied were you with the experience?

Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied	Did not talk with a librarian
1	2	3	4	5	❑

Comments?

13. Did you use the library computer search services? Yes ❑ No ❑
If yes, how satisfied were you?

Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied	Did not talk with a librarian
1	2	3	4	5	❑

Comments?

14. Thinking about the whole course – the manual, readings, classes, instructor, library, and Distance Learning Office – what were its strengths?

15. What were the weaknesses?

16. What two or three things should we change before this course runs again?

Thank you for taking the time and energy to respond.
OISE/Distance Learning C e
Course Feedback

Notes

Notes

Notes

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